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PATENT

Docket No.: 050103-0528

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of : Customer Number: 49745  
Erol GIRT, et al. : Confirmation Number: 3152  
Application No.: 10/776,222 : Tech Center Art Unit: 1773  
Filed: February 12, 2004 : Examiner: BERNATZ, Kevin M.  
For: PERPENDICULAR MAGNETIC RECORDING MEDIA WITH IMPROVED FCC AU-  
CONTAINING INTERLAYERS

## TRANSMITTAL OF APPEAL BRIEF

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Sir:

Submitted herewith is Appellants' Appeal Brief in support of the Notice of Appeal filed April 9, 2007. Please charge the Appeal Brief fee of \$500.00 to Deposit Account 500417.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due under 37 C.F.R. §§ 1.17 and 41.20, and in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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Sir:

This Appeal Brief is submitted in support of the Notice of Appeal filed April 9, 2007, wherein Appellants appeal from the Primary Examiner's rejection of claims 1-5 and 11-20.

Real Party In Interest

This application is assigned to SEAGATE TECHNOLOGY LLC by assignment recorded on February 12, 2004, at Reel 014984, Frame 0045.

Related Appeals and Interferences

Appellants are unaware of any related appeals and interferences.

**Application No. 10/776,222****Status of Claims**

Claims 1-20 are pending in this application. Claims 6-10 are withdrawn from consideration pursuant to a restriction requirement. Claims 1-5 and 11-20 have been finally rejected. It is from the final rejection of claims 1-5 and 11-20 that this appeal is taken.

**Status of Amendments**

No after final amendments were filed in this Application.

**Summary of Claimed Subject Matter**

The present invention is a perpendicular magnetic recording medium comprising a non-magnetic substrate having a surface and a layer stack formed over the substrate surface. The layer stack comprises, in overlying sequence from the substrate surface, a magnetically soft underlayer, a non-magnetic interlayer structure, and a magnetically hard perpendicular main recording layer. The non-magnetic interlayer structure is selected from the group consisting of a structure comprising a layer of a *fcc* Au-containing non-magnetic material having a  $\langle 111 \rangle$  preferred growth orientation and a layer comprising Ru in overlying or underlying contact with the layer of *fcc* Au-containing non-magnetic material; a structure comprising, in overlying sequence, a layer of a *fcc* Au-containing non-magnetic material adjacent the magnetically soft underlayer and having a  $\langle 111 \rangle$  preferred growth orientation, and  $n$  layers of a different *fcc* non-magnetic material having a  $\langle 111 \rangle$  preferred growth orientation, where  $n = 1 - 5$ ; a structure comprising, in overlying sequence, a layer of a *fcc* Au-containing non-magnetic material adjacent the magnetically soft underlayer and having a  $\langle 111 \rangle$

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preferred growth orientation,  $n$  layers of a different *fcc* non-magnetic material having a  $\langle 111 \rangle$  preferred growth orientation, where  $n = 1 - 5$ ; and  $n$  layers of a *hcp* non-magnetic material having a  $\langle 0002 \rangle$  preferred growth orientation, where  $n = 1 - 5$ , and an  $(fcc)_1/(hcp)_1/(fcc)_2/(hcp)_2$  structure comprising, in overlying sequence, a first *fcc* layer  $(fcc)_1$ , a first *hcp* layer  $(hcp)_1$ , a second *fcc* layer  $(fcc)_2$ , and a second *hcp* layer  $(hcp)_2$ , wherein at least the first *fcc* layer is an Au-containing non-magnetic material (see page 5, line 19 to page 6, line 10; page 5, lines 15-24; and page 14, lines 21-23 of the written description).

In certain embodiments of the present invention, the non-magnetic interlayer structure is about 0.2 to about 50 nm thick (see page 6, lines 25-26 of written description). In certain other embodiments of the present invention, the layer of *fcc* Au-containing material having a  $\langle 111 \rangle$  preferred growth orientation is about 0.2 to about 20 nm thick and comprises Au with at least one element added thereto, selected from the group consisting of Al, Ag, Cr, Cu, Ga, Hf, In, Ir, Mn, Nb, Pd, Pt, Sc, Sn, Ta, Ti, V, Zn, Zr, Mo, and W (see page 6, lines 27 to page 7, line 2 of the written description). In certain other embodiments of the present invention, the magnetically soft underlayer is about 10 to about 1,000 nm thick and comprised of Fe containing at least one element selected from the group consisting of Co, B, P, Si, C, N, Zr, Nb, Hf, Ta, Al, Cu, Ag, and Au (see page 7, lines 14-17 of the written description). In certain other embodiments of the present invention, the magnetically hard perpendicular recording layer is about 2 to about 30 nm thick and includes at least one layer of a ferromagnetic material selected from the group consisting of: (1) Co alloys containing at least one element selected from the group consisting of Pt, Cr, Ta, B, Cu, W, Mo, and Nb, with or without at least one oxide selected from the group consisting of Si, Ti, Zr, Al, C, Co, Nb, Mg, and Zn; (2) iron nitrides; and (3)  $(CoX/Pd \text{ or } Pt)_n$  multilayer magnetic superlattice structures, where  $n$  is an integer from about 10 to about 25, each of the alternating, thin layers of Co-based magnetic alloy is from about 0.2 to about 0.6 nm thick, X is

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an element selected from the group consisting of Cr, Ta, B, Mo, Pt, W, and Fe, and each of the alternating thin, non-magnetic layers of Pd or Pt is about 0.6 to about 1.2 nm thick (see page 7, lines 17-28 of the written description). In certain other embodiments of the present invention, the non-magnetic substrate comprises a material selected from the group consisting of Al, NiP-plated Al, Al-Mg alloys, other Al-based alloys, other non-magnetic metals, other non-magnetic alloys, glass, ceramics, polymers, glass-ceramics, and composites and/or laminates thereof, and may further include an adhesion layer on the surface thereof, comprised of a material selected from the group consisting of Cr, CrTi, Ti, and TiNb (see page 7, line 28 to page 8, line 4 of the written description.)

The present invention addresses and solves problems attendant upon the design and manufacture of improved performance ultra-high areal recording density perpendicular magnetic recording media, while maintaining full compatibility with the economic requirements of cost-effective, large-scale automated manufacturing technology (see page 5, lines 5-9 of the written description).

**Grounds of Rejection To Be Reviewed By Appeal**

1. Claims 1, 13, 14, 17, 18, and 20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Lambeth et al. (WO 99/24973) in view of Nakamura et al. (U.S. Pat. Pub. No. 2004/0027868).
2. Claims 1-5 and 11-20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Abarra et al. (U.S. Pat. Pub. No. 2003/0186086) in view of the knowledge in the art as exemplified by Chen et al. (U.S. Pat. Pub. No. 2004/0191578) and/or Lal et al. (U.S. Pat. No. 5,922,442) and/or Malhotra et al. (IEEE Trans. Mag., 36(5), 9/2000, 2309-2311).

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3. Claims 1-5 and 11-20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Abarra et al. in view of Yamamoto et al. (U.S. Pat. Pub. No. 2004/0043258) in view of the knowledge in the art as exemplified by Chen et al. and/or Lal et al. and/or Malhotra et al.

4. Claims 1-5, 11-13, 17, and 20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Yamamoto et al. in view of Nakamura et al.

5. Claims 14-16, 18, and 19 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Yamamoto et al. in view of Nakamura et al. and further in view of Abarra et al.

**Argument**

**1 Rejection under 35 U.S.C. § 103(a) over WO 99/24973 in view of U.S. Pat. Pub. No. 2004/0027868**

**Claims 1, 13, 14, 17, 18, and 20**

**The Examiner's Position:**

The Examiner contends that Lambeth et al. disclose a perpendicular magnetic recording medium comprising a non-magnetic interlayer structure having layers of (111) Ag and (0002) Ti in contact. The Examiner asserted that Lambeth et al. teach that both Au and Ag are suitable fcc materials (June 23, 2006 Office Action, page 5). The Examiner acknowledged that Lambeth et al. fail to disclose the layer of different material comprising Ru, instead teaching a layer of hcp titanium. The Examiner deemed that hcp titanium layers and hcp Ru layers or Ru alloys are known equivalents in hcp non-magnetic interlayers for use in controlling the crystallographic growth, orientation and properties of perpendicular recording media as taught by Nakamura et al. (December 8, 2006 Office Action, page 2).

**Application No. 10/776,222****Appellants' Position:**

The appealed claims were subject to an Election of Species Requirement dated March 14, 2006. Appellants elected Species I, wherein the non-magnetic interlayer structure comprises a layer of a *fcc* Au-containing non-magnetic material having a  $\langle 111 \rangle$  preferred growth orientation and a layer comprising Ru in overlying or underlying contact with said layer of *fcc* Au-containing non-magnetic material in the Response to Restriction Requirement filed April 14, 2006.

The Examiner has not established that hcp titanium and hcp Ru or Ru alloy layers are known equivalents in perpendicular magnetic recording medium having a non-magnetic interlayer structure, wherein the interlayer structure comprises a layer of a *fcc* Au-containing non-magnetic material having a  $\langle 111 \rangle$  preferred growth orientation and a layer comprising Ru in overlying or underlying contact with the layer of *fcc* Au-containing non-magnetic material, as required by the elected species of claim 1.

In the Advisory Action dated March 26, 2007, the Examiner explained that Nakamura et al. disclose a non-magnetic underlayer comprising a fcc seed layer 103 and a hcp layer composed of Ru overlying the fcc seed layer. The Examiner referred to Table 1 of Nakamura et al. as teaching the equivalency of Ti and Ru.

Table 1, however does not disclose Ti, but rather an alloy of Ti and 10 at % Cr. Therefore, contrary to the Examiner's assertion, there is no teaching in Lambeth et al. or Nakamura et al. that Ti and Ru are equivalents. Furthermore, the data in Table 1 of Nakamura et al. clearly demonstrate that Ru and Ti/10% Cr alloy are not equivalents. The use of Ti/10 % Cr alloy gives a coercive force  $H_c$  of



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2,060 Oe, squareness ratio  $S$  of 0.78, signal to noise ratio SNR of 13.9 dB, and a half width  $\Delta\theta_{50}$  of 10.6, whereas the use of Ru provides  $H_c$  of 4,800,  $S$  of 0.95, SNR of 15.7, and  $\Delta\theta_{50}$  of 5.2.

One of skill in this art would not consider Ru and Ti to be equivalents for use in a nonmagnetic layer. Further, there are large differences in lattice constants and surface energies. The lattice constants for Ru are  $a = 2.7059$  and  $c = 4.2818$ , and for Ti are  $a = 2.9512$  and  $c = 4.6845$ . The surface energy of Ru is  $2.792 \times 10^{-3}$  N/m, while the surface energy of Ti is  $1.953 \times 10^{-3}$  N/m. To obtain a high degree of crystal orientation in the magnetic layer it is desirable to reduce the lattice mismatch between the magnetic layer and the non-magnetic layer. In view of the large difference in the lattice constants of Ru and Ti, one of ordinary skill in this art would not consider them to be equivalents. In addition, Ti layers are more likely to oxidize during subsequent magnetic media processing in environments containing oxygen than a Ru layer.

In order to rely on equivalence as a rationale supporting an obviousness rejection, the equivalency must be recognized in the prior art, and cannot be based on applicants' disclosure or the mere fact that the components at issue are functional or mechanical equivalents. *In re Ruff*, 256 F.2d 590, 118 USPQ 340 (CCPA 1958). The Examiner has clearly not established that Ti and Ru nonmagnetic underlayers are equivalent in the claimed magnetic media.

Obviousness can be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. *In re Kahn*, 441 F.3d 977, 986, 78 USPQ2d 1329, 1335 (Fed. Cir. 2006); *In re Kotzab*, 217 F.3d 1365, 1370 55 USPQ2d 1313, 1317 (Fed. Cir. 2000); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992); *In re Fine*, F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). There is no motivation in Lambeth et al. and Nakamura et al. to substitute an interlayer structure comprising of a layer of a *fcc*

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Au-containing non-magnetic material having a <111> preferred growth orientation and a layer comprising Ru in overlying or underlying contact with the layer of *fcc* Au-containing non-magnetic material into the magnetic recording media of Lambeth et al. to provide the magnetic recording medium according to the elected species recited in claim 1, nor does common sense dictate the Examiner-asserted combination of Lambeth et al. and Nakamura et al. The Examiner has not provided any evidence that there would be any obvious benefit in making the asserted combination of Lambeth et al. and Nakamura et al. *See KSR Int'l Co. v. Teleflex, Inc.*, 500 U.S. \_\_\_\_ (No. 04-1350, April 30, 2007) at 20.

The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). There is no suggestion in either Lambeth et al. or Nakamura et al. to modify the magnetic recording medium of Lambeth et al. to obtain the claimed magnetic recording medium.

The requisite motivation to support the ultimate legal conclusion of obviousness under 35 U.S.C. § 103 is not an abstract concept, but stems from the applied prior art as a whole and realistically impels one having ordinary skill in the art to modify a specific reference in a specific manner to arrive at a specifically claimed invention. *In re Deuel*, 51 F.3d 1552, 34 USPQ2d 1210 (Fed. Cir. 1995); *In re Newell*, 891 F.2d 899, 13 USPQ2d 1248 (Fed. Cir. 1989). Accordingly, the Examiner is charged with the initial burden of identifying a source for the requisite realistic motivation. *Smiths Industries Medical System v. Vital Signs, Inc.*, 183 F.3d 1347, 51 USPQ2d 1415 (Fed. Cir. 1999); *In re Mayne*, 104 F.3d 1339, 41 USPQ2d 1449 (Fed. Cir. 1997). The Examiner did not identify any motivation to substitute an interlayer structure comprising of a layer of *fcc* Au-containing non-magnetic material having a <111> preferred growth orientation and a layer comprising Ru in overlying or underlying

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contact with the layer of *fcc* Au-containing non-magnetic material into the magnetic recording media of Lambeth et al. to provide the magnetic recording medium according to the elected species recited in claim 1.

In rejecting a claim under 35 U.S.C. § 103, the Examiner is required to discharge the initial burden by, *inter alia*, making "clear and particular" factual findings as to a **specific understanding** or **specific technological principle** which would have realistically impelled one having ordinary skill in the art to modify an applied reference to arrive at the claimed invention based upon facts, -- not generalizations. *Ruiz v. A.B. Chance Co.*, 234 F.3d 654, 57 USPQ2d 1161 (Fed. Cir. 2000); *Ecolchem Inc. v. Southern California Edison, Co.*, 227 F.3d 1361, 56 USPQ2d 1065 (Fed. Cir. 2000); *In re Kotzab, supra*; *In re Dembiczak*, 175 F.3d 994, 50 USPQ2d 1614 (Fed. Cir. 1999). That burden has not been discharged, as the Examiner has provided no factual basis for modifying the magnetic medium of Lambeth et al. to include an interlayer structure comprising of a layer of a *fcc* Au-containing non-magnetic material having a <111> preferred growth orientation and a layer comprising Ru in overlying or underlying contact with the layer of *fcc* Au-containing non-magnetic material into the magnetic recording media of Lambeth et al. to provide the magnetic recording medium according to the elected species recited in claim 1.

The only teaching of the perpendicular magnetic recording medium comprising a layer stack comprising, in overlying sequence from the substrate surface, a magnetically soft underlayer, a non-magnetic interlayer structure, and a magnetically hard perpendicular main recording layer, wherein the interlayer structure comprises a layer of a *fcc* Au-containing non-magnetic material having a <111> preferred growth orientation and a layer comprising Ru in overlying or underlying contact with the layer of *fcc* Au-containing non-magnetic material, is found in Appellants' disclosure. However, the teaching or suggestion to make a claimed combination and the reasonable expectation of success must

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both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). The Examiner's retrospective assessment of the claimed invention and use of unsupported conclusory statements are not legally sufficient to generate a case of *prima facie* obviousness. The motivation for modifying the prior art must come from the prior art and must be based on facts. The Examiner is not free to ignore the judicial requirement for facts. To do so is legal error. *In re Lee*, 277 F.3d 1338 (Fed. Cir. 2002). Apparently, the Examiner has relied on improper hindsight reasoning in reaching the conclusion of obviousness.

**2. Rejection under 35 U.S.C. § 103(a) over U.S. Pat. Pub. No. 2003/0186086 in view of the knowledge in the art as exemplified by U.S. Pat. Pub. No. 2004/0191578 and/or U.S. Pat. No. 5,922,442 and/or Malhotra et al. (IEEE Trans. Mag. 36(5), 9/2000, 2309-2311)**

**Claims 1-5 and 11-20**

**The Examiner's Position:**

The Examiner acknowledged that Abarra et al. fail to disclose a layer of different material comprising Ru, and instead teach that element 54 comprises a bcc Cr-M alloy, such as CrMo, CrTi, CrV, or CrW. The Examiner deemed that bcc CrRu layers and bcc Cr-M alloy layers are known equivalents in the bcc non-magnetic interlayers for use in controlling the crystallographic growth, orientation and properties of perpendicular recording media as allegedly taught by Chen et al., Lal et al., and Malhotra et al. (December 8, 2006 Office Action, pages 3 and 4).

**Appellants' Position:**

The Examiner has not established a *prima facie* case of obviousness because the Examiner has not established that bcc CrRu layers and bcc Cr-M alloy layers are known equivalents in perpendicular

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magnetic recording medium having a non-magnetic interlayer structure, wherein the interlayer structure comprises a layer of a *fcc* Au-containing non-magnetic material having a <111> preferred growth orientation and a layer comprising Ru in overlying or underlying contact with the layer of *fcc* Au-containing non-magnetic material, as recited in claim 1.

In order to rely on equivalence as a rationale supporting an obviousness rejection, the equivalency must be recognized in the prior art, and cannot be based on applicants' disclosure or the mere fact that the components at issue are functional or mechanical equivalents. *In re Ruff*, 256 F.2d 590, 118 USPQ 340 (CCPA 1958). The Examiner has not established that the Cr-M alloy of Abarra et al. and the CrRu alloy layers of Chen et al., Lal et al., and Malhotra et al. are known equivalents when used in the claimed structure. Further, because different elements and alloys have different lattice parameters and crystallographic structures and the effect the underlayer has on the overall magnetic recording medium is also dependent on the lattice parameters and crystallographic structure of underlying and overlying layers, it is clear that one of skill in this art would not have recognized that the Cr-M alloy layer of Abarra et al. and the CrRu alloy layers of Chen et al., Lal et al., and Malhotra et al. are known equivalents in the claimed magnetic recording medium.

Obviousness can be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. *In re Kahn*, 441 F.3d 977, 986, 78 USPQ2d 1329, 1335 (Fed. Cir. 2006); *In re Kotzab*, 217 F.3d 1365, 1370 55 USPQ2d 1313, 1317 (Fed. Cir. 2000); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992); *In re Fine*, F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). The Examiner has not provided any motivation in Abarra et al., Chen et al., Lal et al., and Malhotra et al. to substitute an interlayer structure comprising of a layer of a *fcc* Au-containing non-magnetic material having a <111>

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preferred growth orientation and a layer comprising Ru in overlying or underlying contact with the layer of *fcc* Au-containing non-magnetic material into the magnetic recording media of Abarra et al. to provide the magnetic recording medium according to the elected species recited in claim 1, nor does common sense dictate the Examiner-asserted combination of Abarra et al., Chen et al. Lal et al., and Malhotra et al. The Examiner has not provided any evidence that there would be any obvious benefit in making the asserted combination of Abarra et al., Chen et al. Lal et al., and Malhotra et al. See *KSR Int'l Co. v. Teleflex, Inc.*, 500 U.S. \_\_\_\_ (No. 04-1350, April 30, 2007) at 20.

The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). There is no suggestion in either Abarra et al., Chen et al. Lal et al., or Malhotra et al. to modify the magnetic recording medium of Abarra et al. to obtain the claimed magnetic recording medium.

The requisite motivation to support the ultimate legal conclusion of obviousness under 35 U.S.C. § 103 is not an abstract concept, but stems from the applied prior art as a whole and realistically impels one having ordinary skill in the art to modify a specific reference in a specific manner to arrive at a specifically claimed invention. *In re Deuel*, 51 F.3d 1552, 34 USPQ2d 1210 (Fed. Cir. 1995); *In re Newell*, 891 F.2d 899, 13 USPQ2d 1248 (Fed. Cir. 1989). Accordingly, the Examiner is charged with the initial burden of identifying a source for the requisite realistic motivation. *Smiths Industries Medical System v. Vital Signs, Inc.*, 183 F.3d 1347, 51 USPQ2d 1415 (Fed. Cir. 1999); *In re Mayne*, 104 F.3d 1339, 41 USPQ2d 1449 (Fed. Cir. 1997). The Examiner did not identify any motivation to substitute an interlayer structure comprising of a layer of a *fcc* Au-containing non-magnetic material having a <111> preferred growth orientation and a layer comprising Ru in overlying or underlying contact with the layer of *fcc* Au-containing non-magnetic material into the magnetic recording media

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of Abarra et al. to provide the magnetic recording medium according to the elected species recited in claim 1.

In rejecting a claim under 35 U.S.C. § 103, the Examiner is required to discharge the initial burden by, *inter alia*, making "clear and particular" factual findings as to a specific understanding or specific technological principle which would have realistically impelled one having ordinary skill in the art to modify an applied reference to arrive at the claimed invention based upon facts, -- not generalizations. *Ruiz v. A.B. Chance Co.*, 234 F.3d 654, 57 USPQ2d 1161 (Fed. Cir. 2000); *Ecologchem Inc. v. Southern California Edison, Co.*, 227 F.3d 1361, 56 USPQ2d 1065 (Fed. Cir. 2000); *In re Kotzab, supra*; *In re Dembiczak*, 175 F.3d 994, 50 USPQ2d 1614 (Fed. Cir. 1999). That burden has not been discharged, as the Examiner has provided no factual basis for modifying the magnetic medium of Abarra et al. to include an interlayer structure comprising of a layer of a *fcc* Au-containing non-magnetic material having a <111> preferred growth orientation and a layer comprising Ru in overlying or underlying contact with the layer of *fcc* Au-containing non-magnetic material into the magnetic recording media of Abarra et al. to provide the magnetic recording medium according to the elected species recited in claim 1.

Apparently, the Examiner has relied on improper hindsight reasoning in reaching the conclusion of obviousness.

3. Rejection under 35 U.S.C. § 103(a) over U.S. Pat. Pub. No. 2003/0186086 in view of U.S. Pat. Pub. No. 2004/0043258 in view of the knowledge in the art as exemplified by U.S. Pat. Pub. No. 2004/0191578 and/or U.S. Pat. No. 5,922,442 and/or Malhotra et al. (IEEE Trans. Mag. 36(5), 9/2000, 2309-2311)

Claims 1-5 and 11-20

**Application No. 10/776,222****The Examiner's Position:**

The Examiner acknowledged that Abarra et al. fail to disclose a layer of different material comprising Ru, and instead teach that element 54 comprises a bcc Cr-M alloy, such as CrMo, CrTi, CrV, or CrW. The Examiner deemed that bcc CrRu layers and bcc Cr-M alloy layers are known equivalents in the bcc non-magnetic interlayers for use in controlling the crystallographic growth, orientation and properties of perpendicular recording media as allegedly taught by Chen et al. '578, Lal et al., and Malhotra et al. (December 8, 2006 Office Action, pages 3 and 4). In addition, the Examiner acknowledged that Abarra et al. fail to explicitly disclose selecting Au or Au-X from the list of fcc materials. The Examiner, however, averred that Yamamoto et al. illustrate a Cu-X alloy and teach that Au is a suitable equivalent to Cu as a fcc based material (paragraph 0019) (June 23, 2006 Office Action, page 9). The Examiner alleged that substitution of equivalents requires no express motivation as long as the prior art recognizes the equivalency (December 8, 2006 Office Action, pages 4 and 5).

**Appellants' Position:**

The Examiner has not established a prima facie case of obviousness because the Examiner has not established that bcc CrRu layers and bcc Cr-M alloy layers are known equivalents in perpendicular magnetic recording medium having a non-magnetic interlayer structure, wherein the interlayer structure comprises a layer of a *fcc* Au-containing non-magnetic material having a  $\langle 111 \rangle$  preferred growth orientation and a layer comprising Ru in overlying or underlying contact with the layer of *fcc* Au-containing non-magnetic material, as recited in claim 1.

In order to rely on equivalence as a rationale supporting an obviousness rejection, the equivalency must be recognized in the prior art, and cannot be based on applicant's disclosure or the mere fact that the components at issue are functional or mechanical equivalents. *In re Ruff*, 256 F.2d



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590, 118 USPQ 340 (CCPA 1958). The Examiner has not established that the Cr-M alloy of Abarra et al. and the CrRu alloy layers of Chen et al., Lal et al., and Malhotra et al. are known equivalents when used in the claimed structure. Further, because different elements and alloys have different lattice parameters and crystallographic structures and the effect the underlayer has on the overall magnetic recording medium is also dependent on the lattice parameters and crystallographic structure of underlying and overlying layers, it is clear that one of skill in this art would not have recognized the Cr-M alloy layer of Abarra et al. and the CrRu alloy layers of Chen et al., Lal et al., and Malhotra et al. are known equivalents in the claimed magnetic recording medium.

Obviousness can be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. *In re Kahn*, 441 F.3d 977, 986, 78 USPQ2d 1329, 1335 (Fed. Cir. 2006); *In re Kotzab*, 217 F.3d 1365, 1370 55 USPQ2d 1313, 1317 (Fed. Cir. 2000); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992); *In re Fine*, F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). The Examiner has not provided any motivation in Abarra et al., Yamamoto et al., Chen et al. Lal et al., and Malhotra et al. to substitute an interlayer structure comprising of a layer of a *fcc* Au-containing non-magnetic material having a <111> preferred growth orientation and a layer comprising Ru in overlying or underlying contact with the layer of *fcc* Au-containing non-magnetic material into the magnetic recording media of Abarra et al. to provide the magnetic recording medium according to the elected species recited in claim 1, nor does common sense dictate the Examiner-asserted combination of Abarra et al., Yamamoto et al., Chen et al. Lal et al., and Malhotra et al. The Examiner has not provided any evidence that there would be any obvious benefit in making the asserted combination of Abarra et al.,

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Yamamoto et al., Chen et al. Lal et al., and Malhotra et al. *See KSR Int'l Co. v. Teleflex, Inc.*, 500 U.S. \_\_\_\_ (No. 04-1350, April 30, 2007) at 20.

The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). There is no suggestion in either Abarra et al., Yamamoto et al., Chen et al. Lal et al., or Malhotra et al. to modify the magnetic recording medium of Abarra et al. to obtain the claimed magnetic recording medium.

The requisite motivation to support the ultimate legal conclusion of obviousness under 35 U.S.C. § 103 is not an abstract concept, but stems from the applied prior art as a whole and realistically impels one having ordinary skill in the art to modify a specific reference in a specific manner to arrive at a specifically claimed invention. *In re Deuel*, 51 F.3d 1552, 34 USPQ2d 1210 (Fed. Cir. 1995); *In re Newell*, 891 F.2d 899, 13 USPQ2d 1248 (Fed. Cir. 1989). Accordingly, the Examiner is charged with the initial burden of identifying a source for the requisite realistic motivation. *Smiths Industries Medical System v. Vital Signs, Inc.*, 183 F.3d 1347, 51 USPQ2d 1415 (Fed. Cir. 1999); *In re Mayne*, 104 F.3d 1339, 41 USPQ2d 1449 (Fed. Cir. 1997). The Examiner did not identify any motivation to substitute an interlayer structure comprising of a layer of a *fcc* Au-containing non-magnetic material having a <111> preferred growth orientation and a layer comprising Ru in overlying or underlying contact with the layer of *fcc* Au-containing non-magnetic material into the magnetic recording media of Abarra et al. to provide the magnetic recording medium according to the elected species recited in claim 1.

In rejecting a claim under 35 U.S.C. § 103, the Examiner is required to discharge the initial burden by, *inter alia*, making "**clear and particular**" factual findings as to a **specific understanding** or **specific technological principle** which would have **realistically** impelled one having ordinary skill

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in the art to modify an applied reference to arrive at the claimed invention based upon facts, -- not generalizations. *Ruiz v. A.B. Chance Co.*, 234 F.3d 654, 57 USPQ2d 1161 (Fed. Cir. 2000); *Ecolochem Inc. v. Southern California Edison, Co.*, 227 F.3d 1361, 56 USPQ2d 1065 (Fed. Cir. 2000); *In re Kotzab, supra*; *In re Dembiczak*, 175 F.3d 994, 50 USPQ2d 1614 (Fed. Cir. 1999). That burden has not been discharged, as the Examiner has provided no factual basis for modifying the magnetic medium of Abarra et al. to include an interlayer structure comprising of a layer of a *fcc* Au-containing non-magnetic material having a <111> preferred growth orientation and a layer comprising Ru in overlying or underlying contact with the layer of *fcc* Au-containing non-magnetic material into the magnetic recording media of Abarra et al. to provide the magnetic recording medium according to the elected species recited in claim 1.

Apparently, the Examiner has relied on improper hindsight reasoning in reaching the conclusion of obviousness.

**4. Rejection under 35 U.S.C. § 103(a) over U.S. Pat. Pub. No. 2004/0043258 in view of U.S.****Pat. Pub. No. 2004/0027868****Claims 1-5, 11-13, 17, and 20****The Examiner's Position:**

The Examiner acknowledged that Yamamoto et al. fail to disclose the layer of different material comprising Ru, instead teaching a layer of hcp CoCr. The Examiner alleged that Nakamura et al. teach that instead of using a layer of hcp CoCr one should use a layer hcp Ru in order to improve the lattice matching between seed layer and the magnetic layer and hence improve the perpendicular magnetic properties.

**Application No. 10/776,222****Appellants' Position:**

Yamamoto et al. and Nakamura et al., whether taken alone or in combination, do not suggest the claimed perpendicular magnetic recording medium. Yamamoto et al. and Nakamura et al. do not suggest an interlayer structure comprising of a layer of a *fcc* Au-containing non-magnetic material having a <111> preferred growth orientation and a layer comprising Ru in overlying or underlying contact with the layer of *fcc* Au-containing non-magnetic material into the magnetic recording media of Yamamoto et al. to provide the magnetic recording medium according to the elected species recited in claim 1.

Contrary to the Examiner's allegations, there is no suggestion in Nakamura et al. to use a layer of hcp Ru **instead** of hcp CoCr to improve the lattice matching between seed layer and the magnetic layer and hence improve the perpendicular magnetic properties.

Obviousness can be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. *In re Kahn*, 441 F.3d 977, 986, 78 USPQ2d 1329, 1335 (Fed. Cir. 2006); *In re Kotzab*, 217 F.3d 1365, 1370 55 USPQ2d 1313, 1317 (Fed. Cir. 2000); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992); *In re Fine*, F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). The Examiner has not provided any motivation in Yamamoto et al. and Nakamura et al. to substitute an interlayer structure comprising of a layer of a *fcc* Au-containing non-magnetic material having a <111> preferred growth orientation and a layer comprising Ru in overlying or underlying contact with the layer of *fcc* Au-containing non-magnetic material into the magnetic recording media of Yamamoto et al. to provide the magnetic recording medium according to the elected species recited in claim 1, nor does common

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sense dictate the Examiner-asserted combination of Yamamoto et al. and Nakamura et al. The Examiner has not provided any evidence that there would be any obvious benefit in making the asserted combination of Yamamoto et al. and Nakamura et al. *See KSR Int'l Co. v. Teleflex, Inc.*, 500 U.S. \_\_\_\_ (No. 04-1350, April 30, 2007) at 20.

The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). There is no suggestion in either Yamamoto et al. and Nakamura et al. to modify the magnetic recording medium of Yamamoto et al. to obtain the claimed magnetic recording medium.

The requisite motivation to support the ultimate legal conclusion of obviousness under 35 U.S.C. § 103 is not an abstract concept, but stems from the applied prior art as a whole and realistically impels one having ordinary skill in the art to modify a specific reference in a specific manner to arrive at a specifically claimed invention. *In re Deuel*, 51 F.3d 1552, 34 USPQ2d 1210 (Fed. Cir. 1995); *In re Newell*, 891 F.2d 899, 13 USPQ2d 1248 (Fed. Cir. 1989). Accordingly, the Examiner is charged with the initial burden of identifying a source for the requisite realistic motivation. *Smiths Industries Medical System v. Vital Signs, Inc.*, 183 F.3d 1347, 51 USPQ2d 1415 (Fed. Cir. 1999); *In re Mayne*, 104 F.3d 1339, 41 USPQ2d 1449 (Fed. Cir. 1997). The Examiner did not identify any motivation to substitute an interlayer structure comprising of a layer of a *fcc* Au-containing non-magnetic material having a <111> preferred growth orientation and a layer comprising Ru in overlying or underlying contact with the layer of *fcc* Au-containing non-magnetic material into the magnetic recording media of Yamamoto et al. to provide the magnetic recording medium according to the elected species recited in claim 1.

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In rejecting a claim under 35 U.S.C. § 103, the Examiner is required to discharge the initial burden by, *inter alia*, making "clear and particular" factual findings as to a **specific understanding** or **specific technological principle** which would have **realistically** impelled one having ordinary skill in the art to modify an applied reference to arrive at the claimed invention based upon facts, -- not generalizations. *Ruiz v. A.B. Chance Co.*, 234 F.3d 654, 57 USPQ2d 1161 (Fed. Cir. 2000); *Ecolchem Inc. v. Southern California Edison, Co.*, 227 F.3d 1361, 56 USPQ2d 1065 (Fed. Cir. 2000); *In re Kotzab, supra*; *In re Dembiczak*, 175 F.3d 994, 50 USPQ2d 1614 (Fed. Cir. 1999). That burden has not been discharged, as the Examiner has provided no factual basis for modifying the magnetic medium of Yamamoto et al. to include an interlayer structure comprising of a layer of a *fcc* Au-containing non-magnetic material having a <111> preferred growth orientation and a layer comprising Ru in overlying or underlying contact with the layer of *fcc* Au-containing non-magnetic material into the magnetic recording media of Yamamoto et al. to provide the magnetic recording medium according to the elected species recited in claim 1.

Apparently, the Examiner has relied on improper hindsight reasoning in reaching the conclusion of obviousness.

**5. Rejection under 35 U.S.C. § 103(a) over U.S. Pat. Pub. No. 2004/0043258 in view of U.S.**

**Pat. Pub. No. 2004/0027868 and further in view of U.S. Pat. Pub. No. 2003/0186086**

**Claims 14-16, 18, and 19**

**The Examiner's Position:**

The Examiner acknowledged that Yamamoto et al. fail to disclose the layer of different material comprising Ru, instead teaching a layer of hcp CoCr. The Examiner alleged that Nakamura et

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al. teach that instead of using a layer of hcp CoCr one should use a layer hcp Ru in order to improve the lattice matching between seed layer and the magnetic layer and hence improve the perpendicular magnetic properties. The Examiner relied on Abarra et al. to provide a teaching of an adhesion layer.

**Appellants' Position:**

Yamamoto et al., Nakamura et al., and Abarra et al. whether taken alone or in combination, do not suggest the claimed perpendicular magnetic recording medium. Yamamoto et al., Nakamura et al., and Abarra et al. do not suggest an interlayer structure comprising of a layer of a *fcc* Au-containing non-magnetic material having a <111> preferred growth orientation and a layer comprising Ru in overlying or underlying contact with the layer of *fcc* Au-containing non-magnetic material into the magnetic recording media of Yamamoto et al. to provide the magnetic recording medium according to the elected species recited in claim 1.

Contrary to the Examiner's allegations, there is no suggestion in Nakamura et al. to use a layer of hcp Ru instead of hcp CoCr to improve the lattice matching between seed layer and the magnetic layer and hence improve the perpendicular magnetic properties. Abarra et al. do not cure the deficiencies of Nakamura et al. and Yamamoto et al., as Abarra et al. do not suggest using a layer hcp Ru instead of hcp CoCr.

Obviousness can be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. *In re Kahn*, 441 F.3d 977, 986, 78 USPQ2d 1329, 1335 (Fed. Cir. 2006); *In re Kotzab*, 217 F.3d 1365, 1370 55 USPQ2d 1313, 1317 (Fed. Cir. 2000); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941

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(Fed. Cir. 1992); *In re Fine*, F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). The Examiner has not provided any motivation in Yamamoto et al., Nakamura et al., and Abarra et al. to substitute an interlayer structure comprising of a layer of a *fcc* Au-containing non-magnetic material having a <111> preferred growth orientation and a layer comprising Ru in overlying or underlying contact with the layer of *fcc* Au-containing non-magnetic material into the magnetic recording media of Yamamoto et al. to provide the magnetic recording medium according to the elected species recited in claim 1, nor does common sense dictate the Examiner-asserted combination of Yamamoto et al., Nakamura et al., and Abarra et al. The Examiner has not provided any evidence that there would be any obvious benefit in making the asserted combination of Yamamoto et al., Nakamura et al., and Abarra et al. See *KSR Int'l Co. v. Teleflex, Inc.*, 500 U.S. \_\_\_\_ (No. 04-1350, April 30, 2007) at 20.

The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). There is no suggestion in either Yamamoto et al., Nakamura et al., and Abarra et al. to modify the magnetic recording medium of Yamamoto et al. to obtain the claimed magnetic recording medium.

The requisite motivation to support the ultimate legal conclusion of obviousness under 35 U.S.C. § 103 is not an abstract concept, but stems from the applied prior art as a whole and realistically impels one having ordinary skill in the art to modify a specific reference in a specific manner to arrive at a specifically claimed invention. *In re Deuel*, 51 F.3d 1552, 34 USPQ2d 1210 (Fed. Cir. 1995); *In re Newell*, 891 F.2d 899, 13 USPQ2d 1248 (Fed. Cir. 1989). Accordingly, the Examiner is charged with the initial burden of identifying a source for the requisite realistic motivation. *Smiths Industries Medical System v. Vital Signs, Inc.*, 183 F.3d 1347, 51 USPQ2d 1415 (Fed. Cir. 1999); *In re Mayne*, 104 F.3d 1339, 41 USPQ2d 1449 (Fed. Cir. 1997). The Examiner did not identify any motivation to



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substitute an interlayer structure comprising of a layer of a *fcc* Au-containing non-magnetic material having a <111> preferred growth orientation and a layer comprising Ru in overlying or underlying contact with the layer of *fcc* Au-containing non-magnetic material into the magnetic recording media of Yamamoto et al. to provide the magnetic recording medium according to the elected species recited in claim 1.

In rejecting a claim under 35 U.S.C. § 103, the Examiner is required to discharge the initial burden by, *inter alia*, making "clear and particular" factual findings as to a specific understanding or specific technological principle which would have realistically impelled one having ordinary skill in the art to modify an applied reference to arrive at the claimed invention based upon facts, -- not generalizations. *Ruiz v. A.B. Chance Co.*, 234 F.3d 654, 57 USPQ2d 1161 (Fed. Cir. 2000); *Ecolocem Inc. v. Southern California Edison, Co.*, 227 F.3d 1361, 56 USPQ2d 1065 (Fed. Cir. 2000); *In re Kotzab, supra*; *In re Dembiczak*, 175 F.3d 994, 50 USPQ2d 1614 (Fed. Cir. 1999). That burden has not been discharged, as the Examiner has provided no factual basis for modifying the magnetic medium of Yamamoto et al. to include an interlayer structure comprising of a layer of a *fcc* Au-containing non-magnetic material having a <111> preferred growth orientation and a layer comprising Ru in overlying or underlying contact with the layer of *fcc* Au-containing non-magnetic material into the magnetic recording media of Yamamoto et al. to provide the magnetic recording medium according to the elected species recited in claim 1.

Apparently, the Examiner has relied on improper hindsight reasoning in reaching the conclusion of obviousness.

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**Conclusion**

Based upon the arguments submitted supra, Appellants respectfully submit that the Examiner's rejections under 35 U.S.C. §§ 102 and 103 are not legally viable. Appellants, therefore, respectfully solicit the Honorable Board to reverse the Examiner's rejections of claims 1, 13, 14, 17, 18, and 20 as obvious, as evidenced by Lambeth et al. in view of Nakamura et al.; claims 1-5 and 11-20 as obvious, as evidenced by Abarra et al. in view of the knowledge in the art as exemplified by Chen et al. and/or Lal et al. and/or Malhotra et al.; claims 1-5 and 11-20 as obvious, as evidenced by Abarra et al. in view of Yamamoto et al. in view of the knowledge in the art as exemplified by Chen et al. and/or and or Lal et al. and/or Malhotra et al.; claims 1-5, 11-13, 17, and 20 as obvious, as evidenced by Yamamoto et al. in view of Nakamura et al.; and claims 14-16, 18, and 19 as obvious, as evidenced by Yamamoto et al. in view of Nakamura et al. and further in view of Abarra et al.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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**CLAIMS APPENDIX**

1. A perpendicular magnetic recording medium, comprising:

- (a) a non-magnetic substrate having a surface; and
- (b) a layer stack formed over said substrate surface, said layer stack comprising, in

overlying sequence from said substrate surface:

- (i) a magnetically soft underlayer;
- (ii) a non-magnetic interlayer structure; and
- (iii) a magnetically hard perpendicular main recording layer;

wherein said non-magnetic interlayer structure is selected from the group consisting of:

(1) a structure comprising a layer of a *fcc* Au-containing non-magnetic material having a  $\langle 111 \rangle$  preferred growth orientation and a layer comprising Ru in overlying or underlying contact with said layer of *fcc* Au-containing non-magnetic material;

(2) a structure comprising, in overlying sequence, a layer of a *fcc* Au-containing non-magnetic material adjacent said magnetically soft underlayer and having a  $\langle 111 \rangle$  preferred growth orientation; and  $n$  layers of a different *fcc* non-magnetic material having a  $\langle 111 \rangle$  preferred growth orientation, where  $n = 1 - 5$ ;

3 a structure comprising, in overlying sequence, a layer of a *fcc* Au-containing non-magnetic material adjacent said magnetically soft underlayer and having a  $\langle 111 \rangle$  preferred growth orientation;  $n$  layers of a different *fcc* non-magnetic material having a  $\langle 111 \rangle$  preferred growth orientation, where  $n = 1 - 5$ ; and  $n$  layers of a *hcp* non-magnetic material having a  $\langle 0002 \rangle$  preferred growth orientation, where  $n = 1 - 5$ ; and

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4 an  $(fcc)_1/(hcp)_1/(fcc)_2/(hcp)_2$  structure comprising, in overlying sequence, a first  $fcc$  layer  $(fcc)_1$ , a first  $hcp$  layer  $(hcp)_1$ , a second  $fcc$  layer  $(fcc)_2$ , and a second  $hcp$  layer  $(hcp)_2$ , wherein at least the first  $fcc$  layer is an Au-containing non-magnetic material.

2. The medium as in claim 1, wherein:

said non-magnetic interlayer structure is about 0.2 to about 50 nm thick.

3. The medium as in claim 2, wherein:

said non-magnetic interlayer structure is about 0.25 to about 25 nm thick.

4. The medium as in claim 1, wherein:

said layer of a  $fcc$  Au-containing material having a  $\langle 111 \rangle$  preferred growth orientation is about 0.2 to about 20 nm thick and comprises Au with at least one element added thereto, selected from the group consisting of Al, Ag, Cr, Cu, Ga, Hf, In, Ir, Mn, Nb, Pd, Pt, Sc, Sn, Ta, Ti, V, Zn, Zr, Mo, and W.

5. The medium as in claim 4, wherein:

said layer of a  $fcc$  Au-containing material having a  $\langle 111 \rangle$  preferred growth orientation is about 0.5 to about 10 nm thick.

11. The medium as in claim 1, wherein:

said magnetically soft underlayer is about 10 to about 1,000 nm thick and comprised of Fe containing at least one element selected from the group consisting of Co, B, P, Si, C, N, Zr, Nb, Hf, Ta, Al, Cu, Ag, and Au.

12. The medium as in claim 11, wherein:

said magnetically soft underlayer is about 40 to about 200 nm thick.

13. The medium as in claim 1, wherein:

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said magnetically hard perpendicular recording layer is about 2 to about 30 nm thick and includes at least one layer of a ferromagnetic material selected from the group consisting of: (1) Co alloys containing at least one element selected from the group consisting of Pt, Cr, Ta, B, Cu, W, Mo, and Nb, with or without at least one oxide selected from the group consisting of oxides of Si, Ti, Zr, Al, Cr, Co, Nb, Mg, and Zn; (2) iron nitrides; and (3)  $(\text{CoX/Pd or Pt})_n$  multilayer superlattice structures, where  $n$  is an integer from about 10 to about 25, each of the alternating, thin layers of Co-based magnetic alloy is from about 0.2 to about 0.6 nm thick, X is an element selected from the group consisting of Cr, Ta, B, Mo, Pt, W, and Fe, and each of the alternating thin, non-magnetic layers of Pd or Pt is about 0.6 to about 1.2 nm thick.

14. The medium as in claim 13, wherein:

said magnetically hard perpendicular recording layer is about 4 to about 15 nm thick.

15. The medium as in claim 1, further comprising:

(iv) an amorphous layer up to about 10 nm thick located between said magnetically soft underlayer (i) and said non-magnetic interlayer structure (ii) when said magnetically soft underlayer (i) is not amorphous, and comprised of a material selected from TiCr, TaCr, NiTa, NiNb, NiP, CrZr, and CoW, with or without at least one oxide selected from the group consisting of oxides of Si, Ti, Zr, Al, Cr, Co, Nb, Mg, and Zn.

16. The medium as in claim 15, wherein:

said amorphous layer is about 0.2 to about 2 nm thick.

17. The medium as in claim 1, wherein:

said non-magnetic substrate (a) comprises a material selected from the group consisting of Al, NiP-plated Al, Al-Mg alloys, other Al-based alloys, other non-magnetic metals, other non-magnetic alloys, glass, ceramics, polymers, glass-ceramics, and composites and/or laminates thereof.

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18. The medium as in claim 17, wherein:

said non-magnetic substrate includes an adhesion layer on said surface.

19. The medium as in claim 18, wherein:

said adhesion layer is comprised of a material selected from the group consisting of Cr, CrTi, Ti, and TiNb.

20. The medium as in claim 1, further comprising:

(c) a protective overcoat layer on said main recording layer; and

(d) a lubricant topcoat layer on said protective overcoat layer.

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**EVIDENCE APPENDIX**

No extrinsic evidence is relied upon in this appeal.

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**RELATED PROCEEDINGS APPENDIX**

Appellants are unaware of any related appeals and interferences.